IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	JUMA
Title	FILTER REINFORCED FILTER FOR MOLTEN METAL FILTRATION
Serial Number	10/516,443
371(c) Filing Date	30 November 2004
Art Unit	1797
Examiner	Kim, John
Attorney Docket No.	1489

To: Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. § 1.132

Dear Sir:

I, David A. Norris, hereby swear and state that:

1. I have 18 years experience in the production of ceramic filters for molten metal filtration.

3. I received B.S. and M.S. degrees in Ceramic Engineering from the New York State College of Ceramics at Alfred University, which is located in Alfred, New York.

4. I am very familiar with refractory filters as used in the casting of molten metals.

5. I have carried out and supervised numerous experimental and commercial trials concerning refractory filters.

6. I have reviewed the contents of U.S. Patent Application No. 10/516,443 ("the '443 application"), which was published as U.S. Patent Publication No. 2005/0229746.

7. I have reviewed U.S. Patent 7,138,084 ("the '084 patent") issuing from U.S. Patent Application No. 10/362,751, and U.S. Patent Publication No. 2007/0090047 ("the '047 publication") of U.S. Patent Application No. 11/584,002.

8. I have obtained and reviewed results of comparative testing of samples of the product claimed in the '084 patent and the '047 publication with the product of the present invention.

9. Graphitizable carbon may be used as a bonding material or binder in the formation of a filter for molten metal filtration only if it is fired in a non-oxidizing atmosphere.

10. The claims in the '084 patent do not specify the type of carbon present in the filter. Their undue breadth includes the diamond form of carbon. The examples teach only the use of RAUXOLIT binder in the process by which the product is formed.

11. High melting pitch serves as the binder in the present invention. High melting pitch contains graphitizable carbon.

12. The graphitizable carbon filters of the present invention display chemical and physical properties that differ from those of the glassy carbon filters of the '084 patent and the '047 publication. Thermogravimetric analyses of the filters show that the carbon phases burn off at a lower temperature for the '084 and '047 product, indicating a higher proportion of glassy phase than in the product of the present invention. The possibility of obtaining the product of the present invention with its distinguishable thermal properties is not made apparent in the '084 patent or the '047 publication.

13. A good and usable filter which is produced from graphitizable carbon may contain less than 15% carbon while those bonded by glassy carbon have to contain greater than 25% and even up to 50%. Consequently, filters produced from graphitizable carbon are stronger and less susceptible to oxidation during use then those bonded with glassy carbon bonding. Greater weight loss is expected for glassy carbon filters than for graphitizable carbon filters in the pyrolysis process. The expected high shrinkage rate during processing of glassy carbon filters would make it very difficult to make large filters. Consequently, large glassy carbon bonded filters are not commercially available as is seen in Stelex Pro Literature. Filters up to 300mm have been made from graphitizable carbon according to the accompanying production scheme.

14. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

Date: 10/17/97

David A. Norris

FOSECO

Date: October 2004

Filtration Product Data Sheet

STELEX* PrO

ceramic foam filters for the production of carbon steel and low-alloy steel castings

Product Description

STELEX* PrO ceramic foam filters are made of a carbon-aluminium oxide ceramic. The special physical properties of this ceramic material are low thermal mass, very good hot strength, low refractoriness under load, low thermal expansion and excellent thermal shock resistance.

STELEX* PrO filters are resistant to all usual slags and deoxidising agents. They have been designed primarily for the filtration of carbon steel and low-alloy steel castings with a carbon content greater than 0.15% and can be used in all conventional moulding and casting processes.

Properties

STELEX* PrO ceramic foam filters enable low turbulence mould filling, thereby reducing the risk of reoxidisation defects and moulding sand erosion problems. The open, porous structure of **STELEX* PrO** combined with its large surface area enable a highly efficient removal of oxide slags, refractory material and moulding sand from the molten steel. Even the most finely dispersed inclusions can be efficiently removed either on the surface or within the body of the filter.

Product Application

The highest filtration efficiency is achieved when **STELEX* PrO** filters are located in the mould, as close to the casting cavity as possible. In sand moulds, square filters are built into the running system using special filter print designs specifically developed by FOSECO for this purpose.

Round filters are more commonly used in **KALPUR*** direct pour applications where they are located inside an insulating or exothermic feeder sleeve, with optimum feed characteristics being achieved when the filter is allowed to float after pouring.

The size of the filter to be used is based on the filter area required. This is primarily determined by the weight of steel to be filtered although other important factors to be taken into consideration include deoxidation practice, pouring temperature and moulding process.

As the ceramic material of **STELEX* PrO** has excellent priming properties it is not necessary to excessively superheat the melt, as is the case with other steel filter types.

The maximum recommended pouring temperature is 1680°C.

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Filter Sizes Available and Packing Units

STELEX* PrO filters are normally supplied in the standard porosity of 10 ppi (average number of pores per linear inch). The table below details the standard sizes and packing units currently available.

Filter Size	Maximum Filtration Quantity [kg/Filter]		Pieces/Box
	High Level of Deoxidation Products	Low Level of Deoxidation Products	
50 x 50 x 20	55	70	336
55 x 55 x 25	55	90	288
75 x 75 x 25	110	165	144
100 x 100 x 25	195	290	90
125 x 125 x 30	300	460	40
150 x 150 x 30	440	660	30
Ø 50 x 20	40	60	336
Ø 50 x 25	40	60	288
Ø 60 x 25	55	80	210
Ø 70 x 25	75	110	144
Ø 75 x 25	85	130	144
Ø 80 x 25	100	145	90
Ø 90 x 25	125	185	90
Ø 100 x 25	155	225	90
Ø 125 x 30	240	360	40
Ø 150 x 30	345	520	30
Ø 200 x 35	610	910	12

Special non-standard filter types may be available on request.

Typical Capacities

The table also shows the recommended capacities per filter size based on 1.95 kg/cm^2 for a high level of deoxidisation products and 2.90 kg/cm^2 for a low level of deoxidisation products.

Other factors which can reduce filter capacity:
- deoxidisation with zirconium containing materials
- molten metal containing large quantities of inclusion materials
- low metal pouring temperatures
- low ferrostatic pressure on the filter

The capacity values given in the table above are based on practical experience in real foundry applications, they are intended as a guideline only to assist in the selection of the appropriate size and number of filters required and do not represent a product specification.

Further Information

STELEX PrO* ceramic filters may fail if the FOSECO recommended filter print is not used, or the recommended filter capacity is exceeded, or if maximum and minimum pouring temperatures are ignored.

FOSECO will not be held responsible for any damage, including damage to the filter, arising from such incorrect use.

Storage

STELEX* PrO filters should always be stored under dry conditions.

Health and Safety

See Material Safety Data Sheet, copies of which are available on request.

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WO# 43825

VESUVIUS Hi-Tech Ceramics

Process Data Sheet

Part ID: 35-3965

Date - 6/2/2006
Company - Vesuvius UK
PO # 61209341SG
Part - 300mmODx50mmTh
Composition - CB ppi -10*
Quantity - 34

Quantity to Cut - 40 # cut - 47

Foam Cut Instructions - Taper -

293.5mmODx49mmTh
Green Cut/Additional Instructions -

NA

RS - 3 EC -NA
Target Density - 0.50 Shrinkage - 0.999

Cutting Person	Time

Process	Desired Viscosity	Desired Wet Weights
1st Dip	See QC004	846±22
2nd Dip	See QC004	1522±40 (RL 1442-1682)
3rd Dip	NA	
4th Dip	NA	
Spray	See QC004	1861±50 *For Reference Only
Edge Coat		
Washcoat		

~~*Use Retainers #1-#4~~
* USE RETAINERS #1W - #4W

Dimensions Approved by:		Foam Quality Approval	Pore Size Approved by:		
293.5X49	293.5X49				
293.5X49	293.5X49				
293.5X49	293.5X49				
293.5X49					
293.5X49					
293.5X49					
293.5X49					

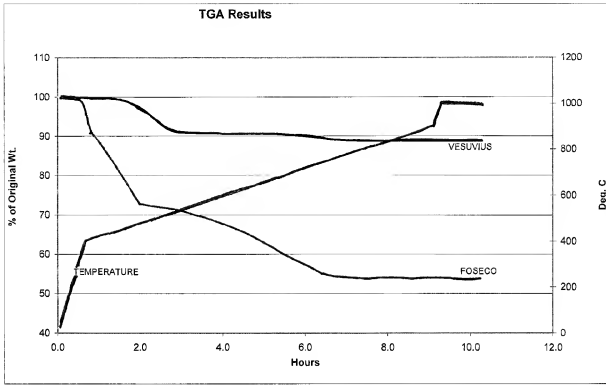
Pre Firing Size:

Firing Date	Furnace Used	Number Fired	Post Firing Part Size Spec. OD:+0/-4mm;TH:+/-1 5mm	Post Firing Part Wt. Spec. 1438-1945
6/13	A	24	297.9X50.1	1457.5

061906

Date Code - 060706A

PR007.02


TGA Results
% of Original Wt.
Deg. C
Hours
VESUVIUS
FOSECO
EMPERATURE
110
100
90
80
70
60
50
40
1200
1000
800
600
400
200
0
0.0
2.0
4.0
6.0
8.0
10.0
12.0